27 Aug 01

DEPARTMENT OF THE AIR FORCE
Aerospace Basic Course (AETC)
Maxwell Air Force Base, Alabama 36112

LESSON PLAN

A1620, METHODS OF TARGETING

CONTENTS

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RECORD OF CHANGES

CHANGE NUMBER	REMARKS
New Lesson Plan	Supercedes ABC lesson 1355 dated 7 Aug 00

SUMMARY OF CHANGES

EDUCATIONAL GOALS

A1000 Area Objective: Apply aerospace power capabilities and officership principles to warfighting.

A1600 Phase Objective: Comprehend how Joint aerospace operations are planned and executed at the theater/operational and tactical levels.

<u>A1620 - METHODS OF TARGETING</u>

Lesson Objective 1: Know the five principles of the Law of Armed Conflict.

Samples of Behavior:

     (R/S) 1.1 - Describe Military Necessity.

     (R/S) 1.2 - Describe Distinction.

     (R/S) 1.2 - Describe Proportionality.

     (R/S) 1.2 - Describe Humanity.

     (R/S) 1.2 - Describe Chivalry.

Lesson Objective 2: Know the principle of effects-based targeting.

Sample of Behavior:

     (R/S) 2.1 - Describe the principle of effects-based targeting.

Lesson Objective 3: Know selected methods of targeting.

Samples of Behavior:

     (R/S) 3.1 - Define Center of Gravity (COG).

     (R/S) 3.2 - Describe Warden's Five Rings.

     (R/S) 3.3 - Describe the four components of Dr. Strange's Model.

(R/S) 3.4 - Describe Nodal Analysis.

Lesson Objective 4: Comprehend how Warden's Five Rings, Dr. Strange's Model, and Nodal Analysis can be used together to identify specific targets.

Samples of Behavior:

(R/S) 4.1 - Explain how Warden's Five Rings contribute to identifying an enemy system's Centers of Gravity.

(R/S) 4.2 - Explain how Dr. Strange's Model identifies target sets within Centers of Gravity.

(R/S) 4.3 - Explain how Nodal Analysis assists in specific target selection within target sets.

Lesson Description: This lesson introduces students to the five principles of the Law of Armed Conflict so students understand which types of enemy targets are protected under US and international law, and therefore, cannot be attacked. This lesson also covers the process of identifying Centers of Gravity (COGs) and key points of attack within an enemy "system." Most importantly, this lesson explores the principle of effects-based targeting, which is key to understanding the full potential of aerospace power.

Prerequisites: A1610, The JAOP

Preparation: Read A1620, Methods of Targeting.
                          Read AFDD 2, pp. 89-91.

Optional: N/A

Rationale/Linkage: This lesson belongs to the A1600 Phase of instruction, which focuses on Joint aerospace operations planning and execution at the theater/operational and tactical levels. In A1610, The JAOP, students learn how aerospace operations are planned at the theater/operational level. In this lesson, students learn how "targeteers" translate operational plans into lists of enemy Centers of Gravity, target sets, and targets. This lesson helps students understand how aerospace operations achieve objectives and prepares them for A1640, Target Identification Exercise and the A1700 Phase--Blue Thunder.

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INSTRUCTIONAL PLAN

1. **TITLE AND LENGTH OF SEMINAR:** Methods of Targeting (1:00)

2. **RELATION TO OTHER INSTRUCTION:** This lesson belongs to the A1600 Phase of instruction, which focuses on Joint aerospace operations planning and execution at the theater/operational and tactical levels. In A1610, The JAOP, students learn how aerospace operations are planned at the theater/operational level. In this lesson, students learn how "targeteers" translate operational plans into lists of enemy Centers of Gravity, target sets, and targets. This lesson helps students understand how aerospace operations achieve objectives and prepares them for A1640, Target Identification Exercise and the A1700 Phase--Blue Thunder.

3. **GENERAL METHOD OF INSTRUCTION:**

   a. **Presentation Method:** Guided discussion

   b. **Time Outline:**

Segment Time	Total Time	Description
0:05	(0:05)	Introduction
0:10	(0:15)	MP I: LOAC Principles
0:10	(0:25)	MP II: Effects-Based Targeting
0:30	(0:55)	MP III: Methods of Targeting
0:05	(1:00)	Conclusion

   c. **Instructor Preparation:**

   - Review the lesson plan.
   - Read A1620, Methods of Targeting.
   - Read AFDD 2, pp. 89-91.
   - Read Col Phillip S. Meilinger, <u>10 Propositions Regarding Air Power</u>, pp. 20-40.
   - Read Col Phillip S. Meilinger, "Air Strategy: Targeting for Effect." <u>Aerospace Power Journal</u> (Winter 1999): 48-61.

d. Instructional Aids/Handouts:

- Video Clip: AF Video of "Bombs on Target"
- A1620-HO, "Methods of Targeting Handout"
- Slides

e. Student Preparation:

- Read A1620, Methods of Targeting.
- Read AFDD 2, pp. 89-91.
- Study the Nodal Analysis Toolbook (on the Flight computer).

f. Strategy: This lesson is a guided discussion. In the motivation step, emphasize that this lesson explains the tools we use to translate theater/operational-level objectives into tactical-level targets. The first main point focuses on the five principles of LOAC, so students understand which types of enemy targets are protected under US and international law, and therefore, cannot be attacked. The second main point focuses on the principle of effects-based targeting, so students understand the kinds of effects we hope to achieve by striking the most important targets. The third main point focuses on COGs, Warden's Five Rings, Dr. Strange's Model, and Nodal Analysis--the methods of targeting that we use to achieve our objectives. In this discussion, focus on how each of the targeting methods work and how "targeteers" can use each to achieve the objectives of aerospace operations. Use the student handout and whiteboard to help students understand these methods of targeting. Finally, remind students that these methods of targeting will help them understand how aerospace operations achieve objectives by putting bombs on particular targets, and that they will get a chance to use these methods in A1640, Target Identification Exercise and the A1700 Phase--Blue Thunder.
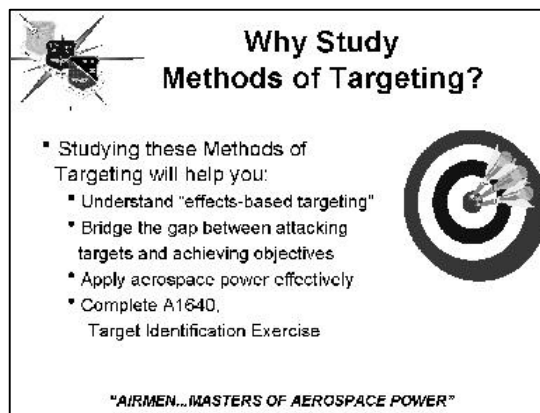
g. References: N/A

4. **DETAILS OF INSTRUCTION**:

  a. **Introduction:** 0:05 (0:05)

    1) //Attention//

{Instructor Note: Show "Bombs on Target" video clip.}
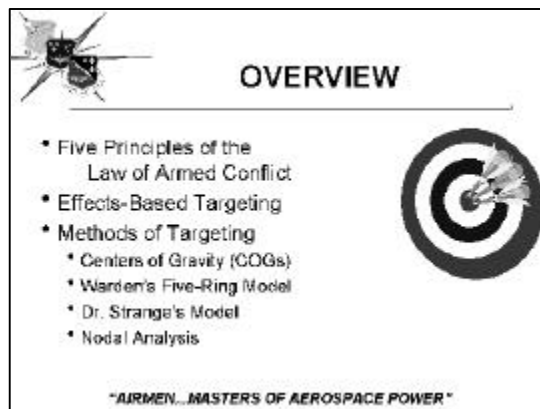
    2) //Motivation//

[SLIDE]

You know that we can strike any point on the globe with extreme precision. But how do we know which targets to select? How do we determine the effects attacking particular targets will have on an enemy? How do we bridge the gap between setting objectives and putting bombs on target? This lesson will help answer these questions.

[SLIDE]

3) //Overview//

We'll begin by reviewing the five principles of the Law of Armed Conflict (LOAC). Then, we'll discuss effects-based targeting, which is the principle that guides target selection. Then, we'll discuss several methods of targeting. First, we'll talk about the concept of a center of gravity, or "COG." Then, we will discuss Warden's Five Rings. The Five Rings Model is a tool you can use to identify COGs. We'll then discuss how attacking COGs directly can often be an expensive proposition, so we'll look at ways we might be able to affect COGs by attacking those things a COG relies on. The model we'll use is Dr. Strange's Model, which helps us identify target sets within a COG. We'll also discuss Nodal Analysis, which is commonly used by targeting specialists for selecting specific targets with a target set. Let's begin!

   b. MP I: LOAC Principles: 0:10 (0:15)

QUESTIONS

LEAD-OFF QUESTION (LOQ): WHAT IS THE LOAC PRINCIPLE OF MILITARY NECESSITY?

ANTICIPATE RESPONSES (AR):
   • An act during war is lawful if it is necessary to accomplish a legitimate military objective
   • Force used should be no greater than necessary

FOLLOW-UP QUESTION (FUQ): WHAT IS THE LOAC PRINCIPLE OF DISTINCTION?

AR:
   • Requires that attackers and defenders distinguish between military objectives and protected places and civilians

FUQ: WHAT IS THE LOAC PRINCIPLE OF PROPORTIONALITY?

AR:
   • Requires that we minimize collateral damage by using force no greater than necessary to accomplish legitimate military objectives

FUQ: WHAT IS THE LOAC PRINCIPLE OF HUMANITY?

AR:
- Prohibits the infliction of unnecessary suffering not necessary for the purpose of war

FUQ: WHAT IS THE LOAC PRINCIPLE OF CHIVALRY?

AR:
- Concept of fighting fair
- Prohibits misuse of flags of truce and other protected symbols like Red Cross or Crescent

INTERIM SUMMARY (Instructor Note):

1. Include students' ideas that support main points.
2. Add new information as necessary.
3. Reinforce key elements that will be needed throughout the lesson.

(TRANSITION): NOW THAT WE HAVE REVIEWED THE LAWS OF ARMED CONFLICT, LET'S TAKE A LOOK AT THE BASIC PRINCIPLE THAT GUIDES TARGET SELECTION: EFFECTS-BASED TARGETING.

    c. MP II: Effects-Based Targeting: 0:10 (0:25)

LOQ: WHAT IS EFFECTS-BASED TARGETING?

AR:
- The selection of targets that when attacked will produce physical and psychological consequences or effects
- Contributes to the achievement of an objective

FUQ: WHICH ENEMY SYSTEM DOES EFFECTS-BASED TARGETING CONSIDER THE MOST IMPORTANT?

AR:
- None! The <u>systems</u> aren't important--the <u>effects</u> on the enemy are!

FUQ: AGAINST WHICH STANDARD DO WE MEASURE ALL POTENTIAL TARGETS?

AR:
- We measure targets by their contribution to achieving our objectives

FUQ: ON WHICH LEVEL OR LEVELS OF THE ENEMY'S "SYSTEM" CAN WE APPLY EFFECTS-BASED TARGETING?

AR:
- We can apply effects-based targeting at all levels--strategic, theater/ operational, and tactical

FUQ: IN THE PAST, WHEN WE DEVELOPED THE CONCEPT OF EFFECTS-BASED TARGETING, WHAT DID WE TRADITIONALLY EMPHASIZE WHEN ATTEMPTING TO MEASURE THE EFFECTS OF MILITARY OPERATIONS?

AR:
- We focused on the quantitative aspect of operations--i.e. sorties rates, body counts, number of bombs dropped, etc.

FUQ: WHICH EFFECTS ARE THE MOST DIFFICULT TO MEASURE?

AR:
- The psychological impact of our operations on the enemy
- The overall effect of our operations on the entire enemy "system"

FUQ: SINCE WE CAN ESTIMATE THE PHYSICAL (OR, "QUANTITATIVE") EFFECTS OF OUR OPERATIONS, SHOULD WE CONSIDER EFFECTS-BASED TARGETING A "SCIENTIFIC" EXERCISE?

AR:
- No. Like force packaging, effects-based targeting is another aspect of the "operational art"

FUQ: FROM YOUR READING--ESPECIALLY THE SELECTION FROM <u>THUNDER AND LIGHTNING</u> AND THE SELECTION ON EFFECTS-BASED TARGETING, HOW WOULD YOU DEFINE "STRATEGIC PARALYSIS?"

AR:

*{**Instructor Note:** The readings don't explicitly define "strategic paralysis." Entertain student ideas regarding the concept of strategic paralysis. Make sure the students consider the following Anticipated Responses, too.}*

- "Strategic paralysis" is the ultimate goal of effects-based targeting.
- When we have achieved complete strategic paralysis, the enemy is unable to oppose our attacking forces--both aerospace and otherwise.

INTERIM SUMMARY (Instructor Note):

1. Include students' ideas that support main points.
2. Add new information as necessary.
3. Reinforce key elements that will be needed throughout the lesson.

(TRANSITION): NOW THAT WE UNDERSTAND EFFECTS-BASED TARGETING, LET'S TAKE A LOOK AT THE TOOLS WE CAN USE TO SELECT TARGETS.

    d. MP III: Methods of Targeting: 0:30 (0:55)

LOQ: WHAT IS A CENTER OF GRAVITY (OR, COG)?

AR:
- Characteristics, capabilities, or localities from which a military or nation derives its freedom of action, physical strength, or will to fight
- Primary sources of moral or physical strength, power, or will to resist
- Hub of all power and movement

FUQ: WHAT DO EACH OF WARDEN'S FIVE RINGS REPRESENT?

AR:

- Ring #1 (Innermost/Most critical): Leadership--command structure of government and military forces
- Ring #2: Organic essentials--essential raw materials, industries, facilities or processes
- Ring #3: Infrastructure--transportation system, rail lines, airlines, highways, bridges, ports
- Ring #4: Population--civilians and refugees
- Ring #5 (Outermost/Least critical): Fielded forces (or, Fighting mechanism)--all military forces and combatants

FUQ: IN GENERAL, HOW CAN WE USE WARDEN'S MODEL TO PLAN AEROSPACE OPERATIONS THAT CAN PRODUCE STRATEGIC PARALYSIS?

AR:

- Through "parallel operations": Simultaneously attack targets in each of the Five Rings

FUQ: HOW DOES WARDEN'S MODEL HELP PLANNERS IDENTIFY AN ENEMY'S CENTERS OF GRAVITY?

AR:

- Warden's model is a systematic way of grouping similar components
- It is a framework for visualizing the entire enemy "system"
- It is an approximation of a "real-world" nation-state
- It helps planners prioritize the enemy's sub-systems from the most critical to the least critical
- So, one could claim that if one "inputs" the entire enemy system into the Warden model, the "output" would be the COGs

FUQ: EXPLAIN WHY WARDEN'S FIVE RINGS DON'T NECESSARILY EQUAL CENTERS OF GRAVITY?

AR:

- Rings represent only a "generic" nation-state--the actual enemy's system may differ considerably

- Planners must draw upon thorough and accurate Operational Environment Research (OER) to determine the enemy's COGs. (Remember: OER is the first stage of JAOP development; COG identification is the third stage.)

FUQ: CAN ONE CENTER OF GRAVITY BE MORE IMPORTANT THAN ANOTHER CENTER OF GRAVITY? EXPLAIN WHY OR WHY NOT.

AR:
- Yes or no, but students need to explain why. Here are two possibilities worth discussing:
- No, because striking COGs across the entire enemy system in simultaneous, parallel operations is the best way to achieve strategic paralysis
- Yes, because the COGs identified as best possible targets in Stage 3 of JAOP development depend on Stage 2 of JAOP development: Objective Determination

(INTERNAL TRANSITION): WE'VE DISCUSSED COGs AND WARDEN'S MODEL, AND SEEN THAT WARDEN'S MODEL HELPS IDENTIFY COGs. NOW, LET'S CONSIDER DR. STRANGE'S MODEL.

LOQ: WHAT ARE THE "INPUTS" AND "OUTPUTS" OF DR. STRANGE'S MODEL?

AR:
- Dr. Strange's model begins with COGs (possibly those identified through Warden's model) and ultimately helps targeteers identify target sets
- Dr. Strange's model uses <u>nouns</u> to identify COGs
- Target sets are categories of things we can attack

FUQ: IN DR. STRANGE'S MODEL, WHAT DOES "CG-CC-CR-CV" STAND FOR?

AR:
- CG = Center of Gravity
- CC = Critical Capability
- CR = Critical Requirements
- CV = Critical Vulnerability

FUQ: HOW DOES DR. STRANGE'S MODEL BREAK DOWN CENTERS OF GRAVITY TO PRODUCE TARGET SETS?

AR:
- Dr. Strange's model is a logical framework for identifying parts of a system that we can attack to have the greatest desired effect on a COG (or CG)
- Identifies Critical Capabilities (CCs)--these are the CG's inherent abilities that enable the CG to function as a CG (described as <u>verbs</u>)
- Identifies Critical Requirements (CRs)--these are the essential conditions, resources, and means for a CC to operate (described as <u>nouns or verbs</u>)
- Identifies Critical Vulnerabilities (CVs), also called "targets sets"--these are the most vulnerable CRs (or components of CRs) that could yield the most decisive results (or at least significant results, results worth much more than the risk involved in striking them) (described as <u>nouns or verbs</u>)

FUQ: ONCE AGAIN, WHAT IS THE DIFFERENCE BETWEEN CENTERS OF GRAVITY AND CRITICAL VULNERABILITIES IN DR. STRANGE'S MODEL?

AR:
- The COG is the thing we want to affect
- The CV is a critical condition, resource, or sub-component within the COG
- If the COG is deprived of the CV, then (ideally) the effect on the COG would be "disproportional" to (i.e., much greater than) the force we use

*{**Instructor Note:** At this point, give each student a copy of A1620-H0-1 thru HO-2, "Methods of Targeting Handout." Review the information on the handout to make sure students understand both Warden's model and Dr. Strange's model. "Walk through" the Example Application of Dr. Strange's CG-CC-CR-CV Model on page A1620-HO-2.}*

FUQ: IN GENERAL, HOW CAN WE USE DR. STRANGE'S MODEL TO PLAN AEROSPACE OPERATIONS THAT CAN PRODUCE STRATEGIC PARALYSIS?

AR:
- Through "parallel operations": Simultaneously attack Critical Vulnerabilities throughout the enemy system

(INTERNAL TRANSITION): NOW THAT WE KNOW HOW DR. STRANGE'S MODEL CAN HELP US IDENTIFY TARGET SETS, LET'S SEE HOW WE CAN IDENTIFY SPECIFIC TARGETS.

FUQ: WHAT IS NODAL ANALYSIS?

AR:
- Technique used to model a system by breaking the system into is component parts
- Analyzing and describing the relationships (or "links") between parts of a system, which are called "nodes"

FUQ: HOW DOES NODAL ANALYSIS HELP IDENTIFY SPECIFIC TARGETS WITHIN A TARGET SET?

AR:
- The technique helps us analyze a target set into its significant parts ("nodes")
- Nodal analysis helps us establish the links between each of the nodes
- Ultimately, this analysis identifies which nodes are "critical nodes"
- Critical nodes are the nodes upon which the system (here, the target set) relies the most
- Therefore, critical nodes are the most logical targets to strike

FUQ: IN GENERAL, HOW CAN WE USE NODAL ANALYSIS TO PLAN AEROSPACE OPERATIONS THAT CAN PRODUCE STRATEGIC PARALYSIS?

AR:
- Through "parallel operations": Simultaneously attack critical nodes throughout the enemy system

INTERIM SUMMARY (Instructor Note):

1. Include students' ideas that support main points.
2. Add new information as necessary.
3. Reinforce key elements that will be needed throughout the lesson.

e. Conclusion: 0:05 (1:00)

    1) //Summary//

We've covered quite a bit in this lesson. First, we discussed the five LOAC principles and how they limit and influence our target selection. Then, we turned our attention to effects-based targeting and several methods of targeting. We defined centers of gravity (COGs) and used Warden's 5-Ring Model as a tool to help us identify them. Then we discussed Strange's Model, which explains that COGs have certain inherent abilities that make the COG important (or, Critical Capabilities), and that certain conditions (or, Critical Requirements) are necessary for the COG to function. We learned that among these Critical Requirements are Critical Vulnerabilities that we can attack to achieve our desired effects on the COG. Ultimately, these CVs are our target sets. We discussed Nodal Analysis as one method of identifying specific targets in a target set.
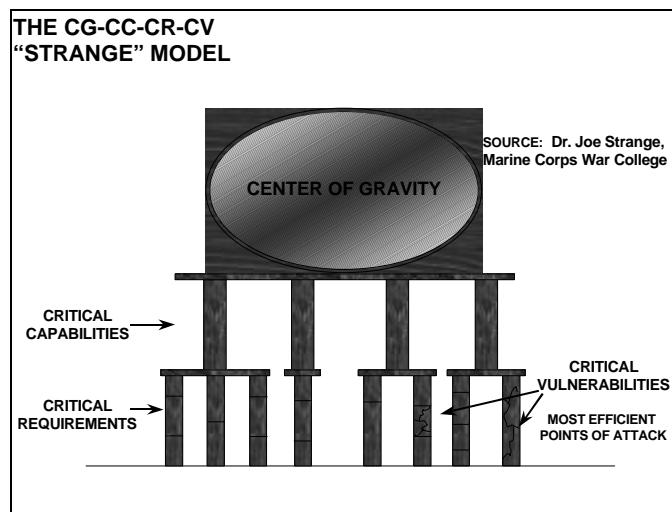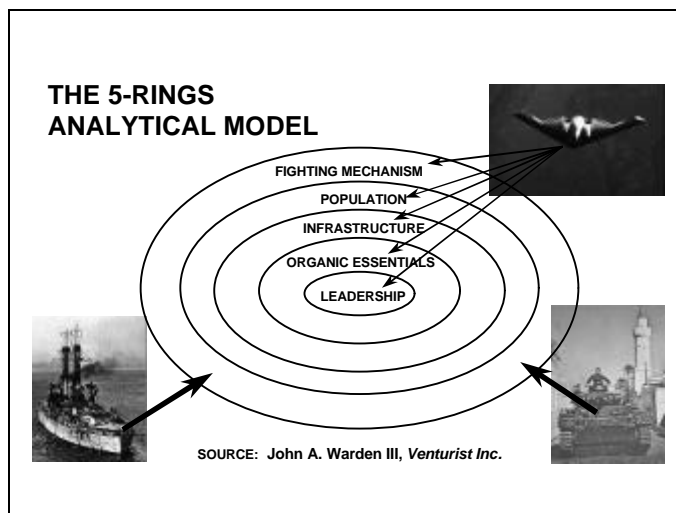
    2) //Remotivation//

The methods of targeting we've discussed will help you apply aerospace power properly in any setting, because they help illustrate how target selection achieves military objectives. You'll need to remember them in A1640, Target Identification Exercise, where you'll use Warden's 5-Rings and Dr. Strange's Model to work from COGs to target sets. Then, you can use Nodal Analysis to narrow your targets sets down to the most decisive targets. You'll also get plenty of chances to use these methods of targeting in the A1700 Phase--Blue Thunder.

    3) //Closure//

Understanding effects-based targeting is crucial to understanding aerospace power. We don't measure the effectiveness of aerospace operations by measuring our "input"--how many sorties we launch, or how many bombs we drop. Rather, we measure the "output"--the effect we produce by striking particular targets. With skill and experience, we can use these methods of targeting to achieve strategic paralysis of the enemy.

Methods of Targeting Handout

THE 5-RINGS
ANALYTICAL MODEL

FIGHTING MECHANISM
POPULATION
INFRASTRUCTURE
ORGANIC ESSENTIALS
LEADERSHIP

SOURCE: John A. Warden III, *Venturist Inc.*

THE CG-CC-CR-CV
"STRANGE" MODEL

CENTER OF GRAVITY

SOURCE: Dr. Joe Strange,
Marine Corps War College

CRITICAL
CAPABILITIES

CRITICAL
REQUIREMENTS

CRITICAL
VULNERABILITIES

MOST EFFICIENT
POINTS OF ATTACK

CG-CC-CR-CV Model, by Dr. Joe Strange, Marine Corps War College

Centers of Gravity (CG): Primary Sources of moral or physical strength, power and resistance. (Described as nouns.)

Critical Capabilities (CC): Inherent abilities enabling a center of gravity to function as such. (Described as verbs.)

Critical Requirements (CR): Essential conditions, resources and/or means for a critical capability to be fully operative. (Described as nouns or verbs, as are CVs.)

Critical Vulnerability (CV): Critical Requirements (or components thereof) which are (or can be made) deficient or vulnerable to neutralization, interdiction, or attack so as to achieve decisive results (or at least significant results--results worth more than the risk involved in striking them).

Example Application of Dr. Strange's CG-CC-CR-CV Model

- CG = Saddam Hussein
  - CC1: survive
    - CR1: resources and means to be protected from all threats (physical and psychological)—safe hiding places, bodyguards, military defenses
  - CC2: stay informed
    - CR2: resources and means to receive essential intelligence (radio, telephone, computer, messenger)
  - CC3: communicate, govern/command
    - CR3: resources and means to communicate with government officials, military leaders, national elites, and "the people" (public broadcasting capability, military communications, chain of command, mail)
  - CC4: influence
    - CR4: determination to persevere in a "cause" or course of action (whether for positive or negative reasons); a reason to maintain confidence or hope, or realization that there is no viable alternative (for his/her country, personally, or both); continued support of the people and powerful government and military leaders (regardless of whether this support stems from positive or negative motivations); perhaps the freedom and means to travel and make public appearances safely

  - CV:
    - Exploitable radio/TV stations
    - C3I
    - HQs, Command Posts
    - AAA Sites
    - IADS (including air defense radar/units, SAMS)

Other Targeting Tools:

The "3-Ds"

Duration:	"How long?"
Disruption:	"How much?"
Distribution:	"How far?"

Attack Options

Lethal:	Affect target by killing (or destroying) it
Nonlethal:	Affect target without killing it--rather, manipulate or control it
Direct Attack:	Attack directly the thing you want to affect
Indirect Attack:	Attack one thing in an effort to affect something else (the main objective)
Parallel Operations:	Simultaneous attack of varied target sets to overwhelm and incapacitate an enemy, often resulting in decisive effects